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COST ACCOUNTANTS & INDUSTRIAL ENGINEERS

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CONTENTS

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Examinations

DECISION was reached by directors of our Society in 1928, to hold examinations in subjects within the Society's field, whenever a sufficient number of candidates should make application, and to issue a certificate to those completing these examinations successfully. Considerable correspondence with members and others interested followed this announcement, and in May, 1931, the first examination was held in Montreal, where a sufficient number of applications had been received.

The Society has not undertaken directly to provide courses of instruction intended to assist candidates for these examinations. It is ready to co-operate in any effort of this kind, however. A class or course of personal instruction is necessarily a local affair, and it is desireable that the local Chapter of our Society should interest itself in any effort of this kind, while our central office will assist in any way possible.

In Montreal, a plan was worked out under the general direction of the Montreal Board of Trade in co-operation with the Canadian Credit Men's Association, the Chartered Institute of Secretaries, the General Accountants' Association, and our own Society, for commercial classes in subjects included in the examinations of these various bodies. Instructors of the classes in subjects of our Society's examinations, are as follows:

Bookkeeping, Partnership and Manufacturing Accounting: R. R. Thompson, M.C., V.D., A.C.A., C.A., Professor of Accounting, McGill University, and past president of our Society; and M. W. Mackenzie, B.Com., C.A., of Clarkson, McDonald, Currie & Co.

Commercial Law: A. D. P. Heeney, M.A., B.C.L., of Meredith, Holden, Heward & Holden.

Cost Accounting: D. R. Patton, B. Com., C.A., Lecturer in Accountancy, McGill University; and L. N. Buzzell, B. Com., C.A., of Clarkson, McDonald, Currie & Co.

Industrial Organization: G. I. Mackenzie, B.Sc., E.E., of Northern Electric Company, Ltd.

In Toronto, a programme of educational work through the medium of evening classes is handled by the Extension Department, University of Toronto, and in recent years the subjects of our examinations have been covered. The instructors in these subjects are as follows:

Accounting: R. R. Grant, C.A., Grant, Godfrey & Co.

Mercantile Law: Alan Van Every, 350 Bay St., Toronto.

Cost Accounting: E. W. Carpenter, De Forest Radio Corporation Ltd., Toronto, secretary, Toronto Chapter.

Business Organization and Administration: W. A. McKague, M.A., general secretary, Canadian Society of Cost Accountants & Industrial Engineers.

In Vancouver, J. J. Plommer, C.A., of Shaw, Salter & Plommer, and a director of our Society, is instructor in cost accounting for the regular students at the University of British Columbia, but as yet no special evening classes in cost accounting have been arranged.

We wish to make it clear that while such classes should be important aids to candidates for examinations of our Society, they are not in each case necessarily planned for this purpose alone, and attendance at such courses is not essential to trying our examinations. Practical experience on the other hand is important for examination purposes.

A correspondence course in one or more subjects of our examinations has been considered, but as yet there does not appear to be sufficient demand to warrant this expense.

Our Society's examination rules are set forth below, together with an outline of the subject matter which may be expected.

Any of the suggested books may be secured through the Society's office, 81 Victoria Street, Toronto, at the published prices indicated.

EXAMINATIONS

(Regulations as amended, October 23, 1931.)

A.—General

1. The Society will grant a Certificate of Efficiency in Cost Accounting and Business Organization and Administration to each person passing its two examinations and submitting a satisfactory thesis.

2. The examinations will be held on the first consecutive Monday and Tuesday in May of each year, at such points as may be decided by the Society. The Society will endeavour to hold an examination at any place where there are four or more candidates.

3. Application to try an examination in the following May, may be made up to February 28 each year, on the form provided by the Society.

4. Candidates for the First Examination must have attained the age of 21 years, and must have at least two years' experience in accounting or cost accounting.

5. Candidates for the Second Examination must have passed the First Examination and must have at least four years' experience in accounting or cost accounting, and must be members of the Society, with fee paid in full for the Society's financial year in which the examination is held.

6. Candidates are at liberty to answer questions in either English or French. Good composition and spelling are general requirements.

7. The pass mark for each subject shall be 60 per cent., and the honor mark 80 per cent.

8. Candidates for the First Examination may obtain exemption from subjects a, b or c of the First Examination, by applying for such exemption and furnishing satisfactory proof: (a) That they have passed the Intermediate Examination of any of the following bodies: Any Society or Institute belonging to the Dominion Association of Chartered Accountants; Corporation of Public Accountants of the Province of Quebec; Institute of Accountants and Auditors of the Province of Quebec; Association of Accountants and Auditors of Ontario;

General Accountants' Association; or (b) That they have passed equivalent examinations, of which the Society approves, in any of these subjects.

9. A candidate for the First Examination must pass all subjects of that examination within a period not exceeding three years. A candidate for the Second Examination must pass both subjects of that examination at the one time.

10. The fees for examination are: First Examination, one or two subjects $5, complete $10; Second Examination complete $10. The fee must accompany the application, and will be returned if the application is refused, or if an examination is not held in a place which in the opinion of the Society is sufficiently convenient for the candidate.

11. Candidates will be supplied with paper suitable for the examinations.

12. A candidate found guilty of any dishonest practice in an examination will be liable to permanent disqualification for examination standing and for membership in the Society.

13. These rules are subject to amendment at any time by the directors of the Society.

B.—First Examination

14. The subjects for the First Examination shall be as follows:

a. Bookkeeping, including double entry, control accounts, columnar journals, closing of books, etc., also simple knowledge of bills of lading, cheques, etc.

b. Accounting, including main principles, capital and revenue, expenditure and receipts, apportionment of expense over departments, and preparation of statements of manufacturing, trading, profit and loss, net income, surplus or appropriation, balance sheets, etc.

c. Law, including main principles of bankruptcy, bills of exchange, companies, contracts, partnership, principal and agent, sale of goods.

d. Cost Accounting, including main principles and records, factory ledgers, distribution of factory overhead, wages, receipt and issue of materials, etc.

15. The time allowed for examination shall be three hours for each of the above subjects.

C.—Second Examination

16. The subjects for the Second Examination shall be as follows:

a. Cost Accounting, advanced.

b. Business Organization and Administration.

17. The time allowed for examination shall be four hours for Cost Accounting and three hours for Business Organization and Administration.

18. Each candidate will be required to mail to the Society's office, by the date of the examination, a thesis describing an entire costing system, including specimens of the principal forms used. This thesis shall be prepared privately by the candidate, and must be entirely his own composition. Two copies must be forwarded to the Society, one entirely in the handwriting of the candidate, and one typewritten. The thesis should not exceed 10,000 words in length.

EXAMINATIONS

OUTLINE OF SUBJECTS

First Examination

(a) Bookkeeping

Principles of debit and credit, and the double entry bookkeeping system, including the use of control accounts for subsidiary ledgers, up to and including the closing of a set of books and preparation of trading and profit and loss statements and balance sheets; invoices, statements of account, etc.; bills of exchange and notes; bills of lading and other commercial documents; capital and revenue receipts and expenditures; reserves for bad debts and discounts; depreciation and reserves for depreciation; columnar journals for departmental concerns; cash books, where cash, etc., banked daily, and where not; imprest system for petty cash; adjustments for interest, expenses paid in advance, accrued charges, etc.; working sheets; single entry.

Books Suggested:

120 Graduated Exercises in Bookkeeping, by Thompson, published by Sir Isaac Pitman & Sons (Canada) Ltd., Toronto. $1.50. Key $1.00. Knowledge of definitions on pages 11, 13 from capital cash receipts to end, 15, 17 from gross profit to end. Knowledge of the uses of all rulings, pages 25, 58.

Accounting, by Smails & Walker, published by Ryerson Press, Toronto. $4.50. Chapters 1-7.

Canadian Modern Accounting, by Sprott & Short, published by Commercial Text Book Co., Toronto. $3.50.

(b) Accounting

Operating Statements and Balance Sheets: Trading, general operating or profit and loss, net income, surplus or appropriation, etc.; current and fixed assets and liabilities.

Partnership: The agreement, various kinds of partners, etc.; various methods of sharing profits and losses; closing off a set of partnership books; admission of a new partner; consolidation of partnership, dissolution and sale to a company.

Goodwill and Its Valuation.

Manufacturing Accounts: Definition of charge-headings and subdivision and grouping; factory ledger and its accounts; closing off the books of a manufacturing partnership and of a manufacturing company; manufacturing statements.

Criticism of Operating Accounts: Methods of comparison of figures for successive periods; cross-checks.

Departmental Accounts: Organization and records required; internal check; distribution of expenses over departments; statements to show results of departments separately; comparison of results of departments' operations.

Voucher Register System.

Depreciation, various kinds, etc.

Reserves, Sinking Funds, etc.: Reserves which must be made before net profits ascertained; reserves of profits.

Various Methods of Quotation: F. O. B., C. I. F., etc.

Incorporated Companies: How a public company is formed; directors, shareholders, etc.; public and private companies; limited liability; common and preferred share capital; different kinds of shares, par and no-par value shares; authorized, subscribed, called and paid capital; bonds and debentures, discounts and premiums; capital and revenue profits and losses; dividends.

Books Suggested:

120 Graduated Exercises in Bookkeeping, by Thompson, published by Sir Isaac Pitman & Sons (Canada) Ltd., Toronto. $1.50. Key $1.00. Exercises R to Z, AA, BB and CC. Knowledge of all definitions, pages 11-17. Knowledge of subdivision of statements as per pages 59-61.

Accounting, by Smails & Walker, published by Ryerson Press, Toronto. $4.50. Chapters 1-11 and 13. Chapter 14, pages 192-200. Chapter 21 for section regarding operating accounts only.

(c) Law.

A knowledge of Canadian law as related to business, including the following: Contract, partnership, companies, bankruptcy and winding up of companies, bills of exchange, principal and agent, sale of goods, contracts, leases, income tax, sales tax.

Books Suggested:

Canadian Statutes.

Digest of Canadian Mercantile Law, by Anger, published by The Anger Publishing Co., Toronto. $4.50.

Law of Negotiable Instruments in Canada, by Falconbridge, published by The Ryerson Press, Toronto. $2.50.

(d) Cost Accounting

A knowledge of the fundamentals of cost accounting, the essential records, and methods of arriving at cost, including the following: Purposes of cost accounting; classifications of cost; process cost accounting; specific order cost accounting; manufacturing expense theory; use of cost records; controlling accounts and perpetual inventories; classification of accounts; accounting for material; material storage and consumption; valuation of materials; accounting for labor costs; accounting for manufacturing expense; distribution of service department costs; distribution of manufacturing expense to production; the cost to make and sell; monthly closing entries; preparation of analytical statements; comparative statements; special conditions.

Books Suggested:

Cost Accounting, by W. B. Lawrence, published by Prentice-Hall, Inc., New York. $5.00. Chapters 1-20.

Business Costs, by Eggleston & Robinson, published by Appleton & Co., New York, $6.00.

Cost Accounting, by Nicholson & Rohrbach, published by Ronald Press Co., New York. $5.00.

Industrial Accounting, by Sanders, published by McGraw-Hill Book Co., New York. $4.00.

Cost Accounting, by Jordan & Harris, published by Ronald Press Co., New York. $4.00.

EXAMINATIONS

Second Examination

(a) Cost Accounting

Advanced and detailed knowledge of costing problems, records and practices, and of cost accounting in relation to inventories, budgetary control, and other devices of the various departments of a business, including the following: Job costs; process costs; building up a cost sheet, and accessory forms such as requisition notes, time tickets, perpetual inventory cards, etc.; relation between general and cost accounts; statement of cost of goods manufactured; statement of trading; statement of profit and loss; ratios for management; presentation of costs to management; comparison of costs among competing companies; debatable methods; interest on investment; graphic charts; relative values; estimating cost systems; establishment of standard costs; uses of standard costs; advantages for auditing; uniform methods.

Books Suggested:

Cost Accounting, by W. B. Lawrence, published by Prentice-Hall, Inc., New York. $5.00. Chapters 1-20.

Business Costs, by Eggleston & Robinson, published by Appleton & Co., New York, $6.00.

Cost Accounting, by Nicholson & Rohrbach, published by Ronald Press Co., New York. $5.00.

Industrial Accounting, by Sanders, published by McGraw-Hill Book Co., New York. $4.00.

Cost Accounting, by Jordan & Harris, published by Ronald Press Co., New York. $4.00.

(b) Business Organization and Administration.

A knowledge of internal organization, both office and plant, of leading types of business concerns, and the functioning of the various departments, including the following: Legal forms of business; general plan of organization of a business; departmental functions and organization—purchasing, production, advertising, sales, shipping, finance, stores, accounting, cost accounting, credit and collection, engineering, traffic, power, maintenance; executive control; location of plant; design and equipment; office organization and management; factory organization and management; employment; wage systems; welfare work; development of new products; net profit angle.

Books Suggested:

Administration of Industrial Enterprises, by Jones, published by Longmans, Green & Co., New York. $3.75.

Thesis:

A description, which should not exceed 10,000 words in length, of an entire costing system in a major industry, and including specimens of the principal forms used. It should cover actual costs, standard costs, and budgetary control. A description of costing in a small concern may be accepted if it covers both fundamentals and details.

Billing and Controlling Accounts at Montreal L. H. & P.

By DUNCAN MacINNES.

(Reprinted from Canadian Office.)

MODERN office appliances have provided the solution of some of the greatest problems of public utility corporations, particularly in billing and accounting departments, where the accounts in the case of large cities may number into hundreds of thousands. One of the most simple and most effective revenue accounting systems of this kind, employing the most up-to-date mechanical equipment is in use by the Montreal Light, Heat and Power Consolidated, who serve on the Island of Montreal more than a quarter million customers.

For the purpose of meter reading and billing the city of Montreal is divided into four main districts, North, South, East and West, and at the beginning of each cycle of work the readers start in each district simultaneously. Each district is divided into routes, a route consisting of about one day's work for the reader, and the cycle of work in the entire territory is completed every two months. Every domestic user of electricity and gas, therefore, receives a bill every two months. In the case of industries, or large users of power, amounting to about eight per cent. of the total number of customers, the meters are read every month. This work is kept separate from the domestic users.

Volume of Work

Some impression of the amount of work that must be handled by the billing and accounting departments may be had from the following figures taken from a recent report of the services given by the company. Residents served with gas totalled approximately 200,000; electricity, 250,000; power, 6,500.

Each route into which the accounts are classified has a distinguishing number, and the readers' books are made up with a separate sheet for each call with columns for the reading of both gas and electric meters. These books or routes serve as the units of work throughout the entire accounting system, the number of the routes being maintained to permit rapid identification.

Special shelving has been installed in the revenue accounting office for the filing of these readers' books when they are not in use, so that they may be convenient for reference purposes and on hand for any changes made in accounts served. The shelves are numbered with the route numbers.

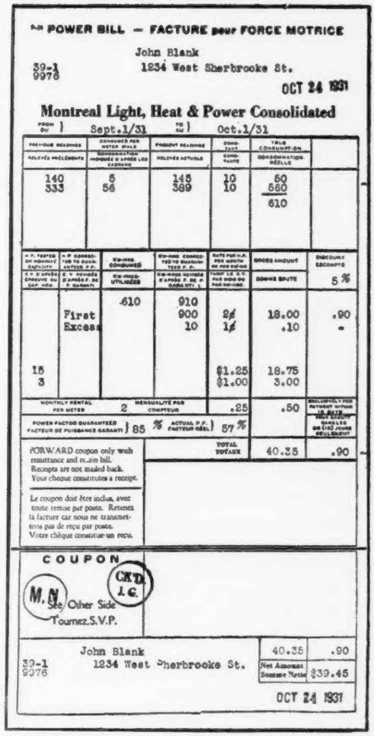
Five or six days previous to the time when the books for a particular district are to be taken out, any changes necessary are made in the books so that they will be corrected up to date when the reader calls. Copies of new service orders, cancellations, etc., are filed in a special filing cabinet, classified according to route numbers so that all changes necessary in a particular route book may be made at one

time. So, when a reader starts on his route the book should be correct, except in cases where customers have moved without advising the company, or a new tenant has moved in without signing a contract. In such cases, the reader is authorized to secure the necessary information.

The meter reader takes the reading of the meters, entering it up and deducting it from the former reading to show in his book the consumption during the two-month period. When a book is completed it is turned into the office, where it is checked for abnormal consumption of electricity or gas, and is then passed directly to the billing department.

In the meantime a list of the route books that have been sent to the meter reading department is given to the addressing department. The stencils for each customer are prepared and filed in cabinet in the same classification as the route books. The Addressograph metal card index plate carries the name of the customer, address, and the route number. Special Addressograph plates are used on which a small sectional plate carrying the customer's name can be removed in the case of the removal of a customer to another address.

Printed bills are used, being prepared in three sections, one of which is used as the customer's receipt, carrying the information regarding consumption and meter reading, gross amount and discount; the second portion is the cashier's stub, which is cut off when the bill is paid, and the third is the collection coupon which is cut off before the bill is delivered and is turned over to the collection department.


POWER BILL — FACTURE pour FORCE MOTRICE
John Blank
39-1
9978
1234 West Sherbrooke St.
OCT 24 1931
Montreal Light, Heat & Power Consolidated
Sept.1/31
Oct.1/31
140
333
5
56
145
389
10
10
50
560
610
5 %
.610
First
Excess
910
900
10
2¢
1¢
18.00
.10
.90
15
3
$1.25
$1.00
18.75
3.00
MONTHLY RENTAL PER METER
2
MENSUALITÉ PAR COMPTEUR
.25
.50
POWER FACTOR GUARANTEED
FACTEUR DE PUISSANCE GARANTI
85 %
ACTUAL P.F.
FACTEUR RÉEL
57 %
TOTAL
TOTAUX
40.35
.90
FORWARD coupon only with remittance and retain bill.
Receipts are not mailed back.
Your cheque constitutes a receipt.
Le coupon doit être inclus, avec toute remise par poste. Retenez la facture car nous ne transmettons pas de reçu par poste.
Votre chèque constitue un reçu.
COUPON
M.N.
CK'D
J.C.
See Other Side
Tournez S.V.P.
John Blank
39-1
9978
1234 West Sherbrooke St.
40.35
.90
Net Amount
Somme Nette
$39.45
OCT 24 1931
Typical Montreal Light, Heat & Power Bill.

Addressing System

The bills are passed through an Automatic Feed Addressograph, which automatically records three impressions of the customer's name, address and route number, one on each of the three sections of the bill as mentioned above. The Addressograph Department is advised of any changes in the route book when the corrections are made in

the books, so that corrected Addressograph plates may be ready for the preparation of the bills. This department is equipped with Addressograph Plate Filing Cabinets, two Addressograph machines and six Graphotype machines for embossing typewriter type on Addressograph Metal Card Index Plates.

The "books" of bills are made up, in the same order as the readers' books and as the readers' books are completed they are delivered with the addressed bills to the billing department, and the billing for these routes is commenced immediately.

Special machines for this class of billing have been installed. There are eleven of these National accounting machines, Ellis Model, installed in the domestic billing department. This machine combines a standard typewriter, standard visible adding and subtracting keyboard and full visible printing line. The typewriter feature of this machine is indispensible for the writing of names and addresses for new accounts, or changes in address.

In making out a bill, the operator takes from the readers' books the previous reading of the meters and the amount of gas or electricity consumed during the period from the previous reading. The machine adds these two and records also on the bill the present reading of the meter, which affords an accurate check on the calculation of the meter reader. The operator then multiplies the consumption by four and by one in the case of the electricity and by twelve and by one and one-half in the case of the gas to arrive at the gross and the discount charges, which are entered in the correct column on the bill. The service charge is then entered in the gross amount column, and the two columns are added.

The carriage then shifts automatically to the cashier's coupon on which is repeated the gross amount, discount and net amount and also on the collection stub.

The average number of bills made out in a day by an operator is 600, some operators completing as many as 1,000 bills in this time.

Four similar machines are used in the power billing department, the power bills are, however, somewhat more complicated than those for domestic service, as it is necessary to take into consideration fixed charges, power factor, etc., in addition to the kilowatt hour consumption.

The output of the billing department averages about 5,000 bills a day. With the readers' books being turned in every day, the work is continuous, and is a true rotation plan of billing with no peaks in the amount of work, except, of course, following holidays when the entire staff must make up for lost time.

Following the preparation of the bills they are given an "eye check" to make sure that the charges have been transferred correctly. Considering the rapidity with which the bills are completed, remarkably few errors occur.

Accounting Reports

From here the bills are taken to another department for tabulation, for income and record purposes. By means of a Burroughs machine the kilowatt hours, cubic feet of gas, gross amounts and discounts are entered to a sales sheet. The identity of the route book is

still maintained for these records, a recapitulation sheet being made up for the tabulations giving the totals for each route. From this, reports are made up for the accounting or financial departments, and these tabulated sheets are used for ledger purposes.

As payments are made the customer's bills are inserted in a National public utilities cash register, which receipts the customer's portion of the bill and cuts off the cashier's coupon. At the close of each day the amount of cash is balanced with the stubs. In addition to the payments made directly at the company's head office, there are, of course, payments made through banks authorized to collect these accounts and through branch offices of the company.

Each day the cashier's stubs and those from the branch office are delivered to the accounting department where they are sorted into routes by means of the route number shown on each stub and are entered by means of a Burroughs machine on cash sheets. The folio, amount of cash paid and the route number of the account is tabulated on these sheets, a total being taken, and balanced with the returns from the cashiers.

These sheets are then taken to other ledger clerks, who post the amounts on the sheets that were made up from the bills before they were delivered.

At the end of the discount period, which is printed on the bill by means of changeable type on the Addressograph machine, the ledgers are balanced, and the bills that remain unpaid are posted to another ledger sheet, on which they are checked off as they are paid. This record of unpaid bills should correspond with the stubs delivered to the collection department. The collection department stubs are cut from the bills, and held in the department until the end of the discount period for reference purposes. At the end of this time the stubs of paid bills are removed and the unpaid stubs are delivered to the collection department, where they are filed in leather covered folios, and kept in a docket filing cabinet. When the bill has not been paid within the discount period this department sends out a notice to the customer, and if the account continues to be unpaid, a collector calls.

Seasonal Work

An abnormal condition exists in the billing department at the expiration of lease periods in Montreal. This occurs at the first of May and October. As an average of about 60,000 families move at May first, a real task is imposed on this department to ensure that each customer receives his final bill as promptly as possible on his old residence. This is arranged by having the customers fill in a form as early as possible and by having the meter readers record in advance customer's intention to move. Prior to the moving period the sheets for those people who are moving are removed from the regular route books, and are set aside for special reading to take place as closely as possible to the first of May. If the customer moves before the meters have been read and a new tenant has moved into the premises, the amount is equalized so that the customer will be charged fairly.

It is interesting to note that even with this unusual condition existing in Montreal that the final bills and transfers are completed within ten days of the first of May. As the services are not cut off in a residence under these circumstances, the customer has no difficulty in moving into a new place.

This is, of course, only a part of the revenue accounting system of the Montreal Light, Heat and Power Consolidated. In addition to the accounts for gas and electricity, there are about 11,000 merchandising accounts covering the sale of appliances on the lease plan. These are payable monthly, the main lease or contract form being used as the ledger sheet on which the payments are entered as they are paid.

In addition to this there is the customers' deposit plan, under which the customers deposit under the rulings of the Quebec Public Service Commission a minimum fee of cash deposit of three dollars when the service is billed monthly and five dollars when the service is billed every two months. Interest at the rate of four per cent. is given to the customer on this deposit which is returned at the discontinuance of service.

Mechanical billing has been used in the Montreal Light, Heat and Power Consolidated for about eight years, previous to which the bills were prepared manually. The saving that has been made possible in time and labor by the use of mechanical devices can be readily appreciated, and customers get their bills as quickly as possible after the reading of the meters. The rotation system of billing used by this company has made possible the handling of a very large volume of accounts with a regularity of work for the meter reading and accounting departments.

Conveyors

By F. M. CONANT,
Link-Belt, Ltd., Toronto, Canada.

WE are living in an age of machinery and mechanical handling. To-day the heavy lifting and carrying are done by elevators and conveyors, cranes, hoists, and power trucks, depending upon the local surroundings and conditions of service.

Coal cars are unloaded mechanically through their hopper bottoms and with conveyors, or else the whole car is overturned by means of a power-operated rotary dumper. The steam or gas shovel digs our ditches and cellars. It is only on the very small job that pick and shovel are used nowadays.

Some of my readers have probably thought of the large number of men this mechanical equipment must have thrown out of work; if so, ponder just a moment on the words, "sewing machine", "typewriter", "linotype". Didn't these inventions throw thousands of men and women out of work?

Yes, but immediately there developed a demand for ready-made garments of every description, and to-day 20 people find employment in the making of clothing where one person was so employed before the advent of the sewing machine.

The business of writing business letters in longhand went out of date. Think of the thousands of women who now find work as stenographers.

The linotype will do the work of four men. How could to-day's newspapers get along without these mechanical typesetters? Besides, it is easy to see that the linotype made more, instead of less, work for men to do.

Think also of the large force of men employed in the manufacture of these time-saving, labor-aiding devices. True enough, there always is a sad period of labor adjustment following the manufacture and adoption of a major device of this character. This is to be expected, but in the end, at least so far, it has been found that there were more jobs than before, although it may have been necessary to move from one place to another due to a shift in the location of the bulk of the jobs.

Neither is it difficult to comprehend that these devices have lowered the cost of manufacture, and raised the standards of living. You wouldn't be able to get to-day's modern motor cars at to-day's price—the price would have to be higher if there were no continuously-moving conveyors on which to assemble them, or to handle the cars' parts continuously, systematically, economically through and between the various processes of manufacture. Of this there can be no doubt, and many would be doing without a car, who to-day manage to own one and enjoy its pleasures.

Summarizing, here are some of the things that the mechanical conveyor has done for humanity:

1. It has taken the drudgery out of man's work, and contributed to the shortening of the length of his work day, thus giving him more time in which to enjoy life.

2. It has aided materially in systematizing production methods, increasing production capacity, reducing handling costs, and through the resulting lower prices to the user or consumer, in making both necessities and luxuries more readily available to us all.

Types of Conveyors

In the factory of which I am superintendent, we employ some conveyors and power transmission machinery as made by Link-Belt Limited, so before preparing this paper it was perhaps natural for me to refer to their 1,100 page general catalogue. It is really amazing to find that there are so many different types of elevators and conveyors to be had. One wonders, on the one hand, couldn't at least several types be discarded without ever losing any benefits through the use of one of the then-remaining standard types?

There arises the question, "How can the average manager, superintendent, purchasing agent intelligently select from the many types and sizes of conveyors, the one type that is best and most economical under the worst conditions of service?" The answer is that perhaps he should not only seek the expert counsel of the conveyor manufacturer, but also depend upon such advice very largely, for, after all, the manufacturer and satisfactory application of conveyors is a business—in which the owners of the business gain valuable experience with the years. The longer they have been in the business, the more applications they have made, the more conditions they have met with perhaps resulting grief, that much better should they be fitted to engineer and sell you a job that will be a credit to both parties, every-

thing considered, such as efficiency, dependability, and ultimate economy.

In this paper I'll confine myself to power-operated continuously-moving conveyors. This, therefore, will eliminate gravity roll conveyors and spiral chutes, also such intermittently-operating mechanical handling equipment as platform elevators, overhead cranes and hoists, and floor trucks and cranes of either the hand or power-propelled types. The subject is big enough if I simply attempt to cover continuous power conveyors, which I shall now classify in two ways, thus:

1. Conveyors for packages or separate pieces.
2. Conveyors for bulk material.

Conveyors for Packages or Separate Pieces

The secret of reducing the cost of handling separate pieces or packages is to handle them as automatically as possible, and to keep them moving continuously in the same direction, or to increase the number of pieces in each load. For instance, a conveyor may operate at the comparatively slow speed of 80 ft. a minute, but if it keeps packages moving "Indian file" with 8 ft. distances between them, ten such boxes, barrels, castings, or whatever the product may be, will be handled per minute, or 600 an hour.

The overhead trolley conveyor is a very popular type, having gained its headway in the automotive industry. It operates from the ceiling or roof trusses, and by not requiring any floor space avoids floor congestion.

The overhead conveyor commonly consists of a suitable power-propelled conveying chain which is suspended on edge from an overhead track by means of trolleys to which the chain is connected. The chain, in turn, has attachments for holding the articles carried. It is a conveyor that is flexible, simple in construction, adaptable, inexpensive, easily installed, readily altered, and that requires but little power to operate and practically no maintenance.

The path of travel can be as irregular as the requirements demand. Inclines, dips and curves in the track are common practice. Obsolete plant layouts are turned into straight-line production methods, without costly re-building. The conveyor will go anywhere, and carry almost any kind of material if the right attachments, hanger or rack is provided. Less aisle space is required in the factory, and floors last longer when it is not necessary to move materials over them all day long on floor trucks.

In many cases, the overhead conveyor is the most ideal way of providing a practically attentionless method of conveying parts or packages of material from one machine, operation, department or building to another in an orderly, continuous and economical manner.

For elevating boxes, rolls, barrels or bales, the tray elevator is frequently used. Rigid arms or brackets are attached at intervals to one or more chains which are made to move continuously in one direction. These arms coming along, one after another, only a few seconds apart, pick up their loads at the lower floor and discharge them as they turn around the sprocket wheels at the upper floor.

When round packages are handled, the carrying arms are made curved, but for handling boxes or other rectangular packages, the arms are straight.

Then there is the suspended tray type of elevator in which the trays or carriers are pivotally attached to two continuously moving chains by means of pins, so that the bottoms always hang horizontal, instead of turning over as the chains pass around the sprocket wheels at head and foot. If the bottoms are made solid, the articles handled must be placed on them and removed from them by hand.

If, however, the bottoms are made with a cross bar, and fingers spaced so as to have slots between them, they can be made to pick up the load from a loading point and discharge it at any one of a number of unloading points. In order to accomplish this, each loading point is arranged with fingers which extend into the slots of the trays and on which the load rests until it is picked up by a tray.

At the unloading points other fingers are arranged in a similar manner to receive the loads, but these fingers are set at an incline so that the rolls or other articles will roll or slide down them and thus get out of the way of the next tray. Where there are several loading and discharge points, the loading and unloading fingers are hinged so that the ones that are not in use can be thrown back out of the way. This type of machine is also used as a lowerator, such as for the lowering of rolls of paper from the paper machine floor down to the store room or direct to the shipping platform.

For moving pieces, parts and packages along a horizontal plane or at a moderate inclination therefrom, there are rubber and canvas belt conveyors operating over a flat surface in the top or carrying run, for handling light packages; and apron and chain conveyors for the heavier pieces.

The apron conveyor is made up, usually, with two strands of roller chain traveling on suitable tracks in both the top and bottom runs,—wooden slats, or else steel pans, tying the two chains together, and thus forming the moving platform, for conveying the material from where it is deposited on the platform to the discharge point. The discharge point may be the head end of the conveyor, or, as in the case of a certain packing box conveyor, the load may be plowed off to one side by means of a simple board placed diagonally across and close to the top of the conveyor. By making these plows hinged, they can be located at desired discharge points and swung into position as required. Heavy machinery parts will be lifted off the conveyor by overhead hoists.

The simple chain conveyor may employ one or more strands of chain, and be equipped with suitably shaped carriers at intervals, such as a curved cradle for carrying a roll of paper, or the chain may simply have specially shaped projecting links, called attachment links, for either pushing the load ahead of it or for pulling it along behind.

Pulpwood log stackers push the logs up the incline in this manner. Then again, chain conveyors may be just plain chains, without any attachment links, as when operating in a horizontal plane there is no need for pulling or retarding the log or pieces of pulpwood—the load is "carried". These plain chain conveyors, sometimes employing as many as five independently operating strands, are called "drag conveyors", and in the single strand form are ideal conveyors of sawdust along the trough in which the chain slides in the top run, when the wide rectangular "H" class chain is used. However, the handling of

sawdust comes under the heading of "bulk conveyors", to which I had better hasten. Might I just mention, though, that the apron conveyor, and the chain conveyor in various forms, both are extensively used in automobile manufacturing and assembly processes, there having the added function of acting as pace makers for the workmen who are working along the assembly line conveyors.

Conveyors for Bulk Material

Under this heading we have:

1. Belt Conveyors.
2. Skip Hoists.
3. Screw Conveyors.
4. Apron Conveyors.
5. Flight Conveyors.
6. Drag Conveyors.
7. Chain and Bucket Conveyors.
8. Power Hoes.

Belt Conveyor

The belt conveyor is especially well suited to the conveying of large quantities of bulk materials, such as coal, sand, ores, clay, chemicals, pulpwood chips, etc., at a low cost per ton, due to its small power consumption and the large capacity that results from its continuous delivery of material at a relatively high belt speed.

The principal elements are the rubber-covered conveying belt, the troughed multi-roll idlers over which the belt moves in the carrying run, the straight rolls over which the belt returns in the bottom run, the end pulleys and driving machinery.

When the material is not to be discharged over the end, or when it is to be delivered into bins or bunkers at various points along the conveyor's travel, a traveling tripper is used. This tripper supports the belt and raises it sufficiently for the material to be discharged through the tripper's one-way or two-way chute to the storage, or to floor below.

Belt conveyors are installed horizontally, or at inclinations up to 18 or 20 degrees therefrom, or both horizontally and inclined, but it should be borne in mind that steep inclines are to be avoided, as the material will start to roll back and the belt-carrying capacity is reduced. Therefore, when the material must be elevated to a considerable height, the belt conveyor may be out of the question due to insufficient space or length being available within which to make the grade, and because of the first cost resulting from the additional length and height of framework needed. Trippers are used only on horizontal sections.

The conveying belt may be from 12″ up to 60″ wide, may operate at 300 ft. to 600 ft. a minute, and have its carrying-run supporting idlers spaced 3 ft. to 5 ft. apart, depending upon the capacity required, the size of lumps, and the weight of the material per cubic foot. The return idlers may be 9 or 10 ft. apart.

The use of the belt conveyor has advanced very rapidly during the past five years due to the perfection of anti-friction idler rolls, thus

prolonging the life of both the rolls and the belt, and further reducing the amount of power required per ton of material handled. The Link-Belt idler is equipped with Timken tapered roller bearings, and with grease reservoirs that need be re-charged at but very infrequent intervals, this being done the Alemite way. Attention to maintenance is reduced to a minimum, and in this connection may I say that accurately made, well-balanced, well-lubricated, free-turning rolls spell long life of the whole equipment. Grease seals also are important, to keep the grease in the reservoir, and the dirt and grit out and away from moving parts.

Skip Hoists

In its simplest form the skip hoist consists of a rectangular bucket running on vertical or inclined tracks, a hoisting cable and a hoisting machine. It has few moving parts, is easy to operate, and is very dependable.

The skip hoist plays an important part in the handling of materials, and has been used extensively in mining operations for generations. It has always been the standard means for feeding blast furnaces, a service for which it is peculiarly adapted, not only because it delivers accurately measured charges at definite intervals of time, but by reason of its reliability.

The skip hoist is well adapted in general for high lifts, and to such uses as:

1. Storage of coal in high bins.

2. Elevation of ashes in boiler plants where large clinkers are produced.

3. Handling any large or coarsely broken material, as well as fines.

4. Lifting abrasive or corrosive materials, since only the loader and bucket are in contact with the material handled.

The skip hoist may be classified in three ways: (1) Single bucket, with no traveling counterweight to offset the dead weight of bucket; (2) Single bucket, counterweighted; and two buckets, one balancing the other, and ascending while the other is descending.

The electrical control is either entirely automatic, semi-automatic, or non-automatic, depending on the requirements.

The loading of the bucket or skip may be accomplished by hand shoveling, or by dumping material into a hopper fitted with a hand-operated discharge regulating gate, or through an entirely automatic loader attached to the bottom of a storage hopper.

The automatic loader may be of (1) the damming type, the bucket continuing to be hoisted and lowered whether or not there is material in the hopper; (2) the full-bucket-control type, causing the bucket to be hoisted when filled, and to remain inoperative when empty or only partially filled; (3) the weight-of-load-in-bucket type, permitting a certain predetermined weight of material to flow into the bucket; or (4) the measuring type, loading the bucket with a fixed volume. In all cases the ascent of the skip closes the discharge gate of the automatic loader, the loader's counterweights holding it in the closed position until contact of the bucket in its descent has again moved the loader into the automatically-discharging position.

The machine's electrical control prevents over-travel of the bucket, and is arranged to shut off the power when excessive slack has accumulated in the hoisting cable. The bucket may have a holding capacity of 20 cu. ft. up to 150 cu. ft. or more. The normal cable speed may run from 40 ft. to 450 ft. a minute, in the handling of such materials as coal, coke, ashes, limestone, gravel, etc.

Screw Conveyor

The screw conveyor is used to excellent advantage in the conveying of such small-size materials as grain, cement, cottonseed and its by-products, pulverized coal, sand, salt, starch, rice, sawdust, sugar, etc.

Screw conveyors are low in first cost, being exceedingly simple in construction and requiring very little head room. The conveyor consists of a spiral mounted on a central shaft or pipe, and serves to "screw" or push the material ahead in the all-steel or wooden steel-lined trough in which the spiral is rotated by suitable driving machinery, and from the top of which trough the ends of the 8, 10, or 12-ft. sections of standard conveyor are supported at intermediate points by means of hanger bearings.

The diameter of the conveyor or spiral may be as small as 3 inches and as large as 24 inches in diameter. The material is discharged either over the end of the conveyor trough, or through gates fitted in the trough's bottom where desired. Sometimes there are simply discharge holes, with no gates, with the result that the coal, for example, discharges through the first opening until the height of pile reaches and closes up the hole. Then the discharge will be through the next hole in trough, and so on until the storage is full.

Screw conveyors are used for moving materials horizontally or at slight inclines not exceeding about 10 degrees. As a rule, their use is confined to the lighter classes of service, and when employed for conveying ashes or other abrasive materials tending to cause rapid wear, the screw and the trough, both, ought to be constructed of cast iron, manganese steel or heat-treated steel.

For conveying wet salt to large cylindrical dryers in a plant of the Morton Salt Company, Caldwell Screw Conveyor, made of Monel metal to prevent discoloration and contamination of the product handled, is employed and accomplishes the intended result.

The screw conveyor is used quite often at sand and gravel washing plants as a dewatering device. The screw has a scrubbing action on the sand and keeps the loam and other foreign matter in suspension, to be carried away in the overflow. Thus a clean and dry sand is secured for use where the specifications and inspection are rigid.

The screw conveyor can often be squeezed into close quarters, where other forms of conveyors could not work.

Apron Conveyors

Apron conveyors have already been described generally, but for handling bulk materials such as ores, limestone, coal, sand, etc., the pans are constructed of steel and made overlapping, so as to have the required strength and to keep the fine material from sifting or falling through to the bottom run. Stationary retaining sides or skirt boards are used to permit a greater depth of material to be carried.

Apron conveyors make excellent feeders from coal track dump hoppers to other conveying media, or to a crusher if it is a case of receiving run-of-mine coal and reducing the large lumps in size before the coal is delivered to the main boilerhouse conveyor.

Apron conveyors may be installed either horizontally or at inclines up to 26 degrees. Owing to their substantial steel construction, the pans will withstand the shock of dumping heavy masses of material on them. As the conveyor operates at a slow speed, usually from 20 to 100 ft. per minute, the maintenance cost is low.

In the metal mining field especially, a very rugged and different form of apron feeder has, of necessity, come into use, as lumps up to 6 ft. dimensions and weighing a ton are sometimes dropped onto the pans at a considerable relative height. To meet such conditions, the pans, the chains, the supporting rollers, and the sprocket wheels, all are made of manganese steel and of a very rugged design.

The chain is constructed with a non-sagging joint so there is no joint movement at all in the carrying run, and is supported on large diameter rollers at intervals, mounted on heavy through shafts turning in closed-end bearings. The chains, moreover, are underneath the pans in the top run, thus protecting them from the action of the grit. Two or three strands of chain are employed, depending upon the conveyor's width, and it should be especially observed that the rollers are not a part of the chain. Everything seems to have been done to secure maximum dependability with minimum attention while at the same time working under extremely severe conditions of service. The pans return over other rollers, not so closely spaced as in carrying run, or if the feeder is short, the return run is unsupported.

Flight Conveyors

The flight or pusher type of conveyor was developed as a means for distributing coal and other non-abrasive materials horizontally or elevating at angles from zero to approximately 45 degrees. The material is received in a trough, pushed along by flights attached to the chain at intervals, and usually discharged through openings in the bottom of the trough, being provided with gates to be opened or closed as the conditions require. In the early days the flight conveyor was made only with a single strand of chain, the flights being fastened to it centrally, and usually made of malleable iron with a thickened scraping edge, as well as with wearing pads for sliding the flights on steel tracks on the return run. In the flight conveyor, the bottom run does the conveying.

The need for greater capacity was met by providing two strands of chain attached to the ends of the flights. A further improvement is the use of rollers suspending the chains and flights, instead of permitting the latter to drag on the bottom of the trough; also the use of double strands of chain with rollers at the articulation joints, to carry the chains and flights.

The flight conveyor is a useful type that has been much used in retail coal pockets over the bins, and at the smaller power plants for receiving coal from track dump hopper and stocking it out alongside, and for distributing coal throughout the length of overhead bunkers.

It is used a great deal where the conveying must be done at greater inclinations than 20 degrees, the maximum inclination at

which a belt conveyor ordinarily can be used. The height of a belt tripper might also preclude the use of a belt conveyor, and make the flight conveyor the best suited where the available height is limited, and where it is desired to discharge the material at various points.

The flight conveyor is not expensive in first cost, but should be avoided for handling abrasive materials, such as ashes and sand, as the sliding or scraping action rapidly wears the trough lining. The conveyor operates at speeds up to 150 ft. per minute, and is suitable for either lumpy or small materials.

Drag Conveyors

The drag chain conveyor has already been referred to, being nothing more than one or more strands of chain sliding along in a trough and carrying the material along with it. I notice that Link-Belt makes a cast steel drag chain for the handling of highly abrasive materials, its chief application being in cement mills, for handling both hot and cold clinker. The links have broad wearing surfaces on upper and lower sides. When worn on one side, the chain's useful life can be renewed by turning it over in the trough and using the other side. The head of each link acts as a pusher for conveying the material. Drag chain conveyors should be operated slowly to minimize wear.

Chain and Bucket Conveyors

The *centrifugal-discharge bucket elevator* usually consists of malleable iron buckets spaced at intervals on a strand of chain, and operates at a speed of 200 to 300 ft. per minute. The material (coal, ashes, etc.) is delivered into a boot, from which it is scooped up by the buckets, elevated, and discharged or thrown by centrifugal force while passing over the head sprocket, into a chute usually leading to a bin or a distributing conveyor. Although one of the earliest types, it is still an ideal bucket elevator for nominal capacity, for handling material that does not have very large lumps, and where the operation is intermittent.

The *perfect-discharge bucket elevator* uses two strands of chain, and has its buckets attached thereto at intervals. This type operates more slowly than the centrifugal type, and has a pair of idler sprockets on the return side just below the head wheels, to deflect the chains and completely invert the buckets, thereby effecting a perfect discharge. Because of its slower pick-up and discharge, the perfect-discharge elevator results in less breakage of friable lumps in the material elevated. When used on an incline, the deflector sprockets may be omitted.

The *continuous bucket elevator* is made up with steel buckets fastened continuously and very close together, on one or two strands of chain, or on a rubber or canvas belt.

The flanged front of each bucket forms a chute for the discharge from the succeeding bucket, thus effecting a clean discharge at slow speed. This slow speed, with the use of a feeding leg, permits feeding the material directly into the buckets, thus avoiding the wear and strain of digging through an accumulation of crushed stone, ore, coal, or other material of a bulky or gritty character, in an elevator boot, besides reducing breakage of the material elevated, and prolonging the elevator's life.

The bucket speed is usually about 100 ft. per minute and up to 200 ft. per minute. The continuous bucket elevator is more expensive, but has greater capacity at slower speed than either the centrifugal or perfect discharge types. It is more expensive because more buckets are required, and the chain and driving machinery must be heavier to carry the greater load, and to handle the same quantity in a given time.

The continuous bucket elevator was developed to fill the need for a better elevating unit than the centrifugal discharge type, and is popularly used in stone quarries for elevating crushed stone into bins.

As the discharge is by gravity and not by centrifugal force, the efficiency or effectiveness of discharge is not particularly dependent upon the speed of the elevator and the speed of discharge.

Gravity-Discharge Bucket Elevator

As the conveying and elevating part progressed to the point where the foregoing types of bucket elevators had been developed for elevating, and the flight conveyor for distributing materials horizontally or at inclinations up to 45 degrees, engineers appreciated the desirability of a single unit for accomplishing both the elevating and distributing operations. The gravity-discharge elevator was designed and built to accomplish this purpose and has come into wide use.

It consists of steel buckets, approximately V-shaped in cross-section, attached at intervals between two strands of chain. Coal or other material is received in a boot, from which it is scooped up by the buckets in passing around the foot wheels, and is elevated to the desired height, where the buckets turn around wheels from a vertical to a horizontal position. The buckets then push the coal along a steel trough and discharge it through gates or openings to an overhead bunker, storage, or other conveyor, as conditions require.

Frequently, coal is discharged or withdrawn from bunkers or storage into the lower horizontal run of the conveyor, pushed along and picked up by the buckets as their travel changes from horizontal to the vertical direction, then elevated, diverted and again shoved along the upper horizontal run for distribution to desired points.

An advantage of this type of equipment is that the material can be carried at any inclination, varying from horizontal to vertical, as the buckets will carry and convey the material at angles too steep for flight or belt conveyors.

The buckets may be spaced from 18 to 48 inches apart and vary in size from 12 to 48 inches long by 24 inches wide,—a normal conveyor speed being 100 ft. a minute. Malleable chains are used for the smaller sizes of buckets, and heavy steel chains for large capacity installations.

This type is not adapted for handling ashes or abrasive materials, which cause rapid wear of the steel trough linings, but is admirably suited for the handling of hard coal as the pick-up in the boot is slow, and in discharging, the material is allowed to slide gently down a chute, instead of being thrown or dropped. This lessens breakage of the material handled. The machine is flexible in its applications, with special reference to the paths of travel that can be arranged, and it is very reliable in operation.

It is used in retail coal pockets, locomotive coaling stations, powerhouses, etc.

The *pivoted bucket carrier* is so called because each bucket is pivotally suspended between two strands of chain, and maintained in the carrying position by gravity, thus permitting a single carrier to transport material horizontally, vertically and again horizontally, or in any desired path within a vertical plane of travel.

The advantages of the pivoted bucket carried may be named briefly as follows:

1. The material is carried, and the bucket line is supported by rollers of large diameter. Destructive friction, and the power required for operation, are reduced to a minimum.

2. Using one machine to both elevate and convey avoids transfers, which are often troublesome, take up valuable space, and necessitates deep pits. In addition, only one driving unit is required.

3. The material handled is automatically discharged on the horizontal runs at any desired point, by a mechanical dumper, and it is only at the dumper that the position of the bucket changes from its original upright position, during the entire cycle of operation.

4. The buckets are overlapping in the horizontal runs, and in the Link-Belt Peck Carrier I understand the buckets right themselves after having been turned by the mechanical dumper and discharged of their contents,—no special mechanism being needed to correct the direction of overlap.

5. Slow speed, quiet operation, with practically no vibration. This results in long life of the conveyor.

As the buckets carry their load, the pivoted bucket carrier is well suited for handling either coal or ashes in boiler houses. A large majority of installations are used for both purposes, with the desirable feature that a single unit takes care of both requirements.

Long pitch chains having links made of malleable iron for ordinary installations, and of forged steel for very high lifts, are used. The chain pitch may be either 18, 24, 30 or 36 inches. The buckets have the same pitch as the chain and are from 15 to 36 inches wide, depending upon the capacity required. The chain joint is usually constructed with case hardened steel pins and bushings and large diameter enclosed-oiling rollers with chilled or flint-rim treads. The conveyor speed may be 40 ft. per minute and up to 80 ft. per minute.

Portable Loaders

Conveyors may be further classified according to whether they are portable or stationary.

The portable loader is very popular for the loading of trucks with bulk materials, such as coal, sand, coke, oxide, borings, etc., and is made with either a belt, chain and flight, or chain and bucket elevating medium. Each type has its uses. The belt and flight types are also employed for unloading hopper bottom cars of coal, sand, etc.,—piling the material alongside or track or delivering it to trucks.

The majority of these portable loaders are hand moved on their four wheels, while for the larger capacities the moving mechanism is a power-operated crawler of regular crane or tank type. This larger-capacity loader has a platform on one side, on which the operator stands, and from this position he controls the various functions of the machine by the convenient manipulation of hand levers.

The hand-propelled machines are pushed close to pile, and require that the material either be shovelled onto the foot end, or if the machine has been pushed hard enough into the material, it may merely be necessary to assist the flow of the material with the aid of a shovel. In this latter case, no actual shovelling is required. The crawler loader has a self-feeder and crawls under power—as it digs—as it loads.

The chain and flight, and belt loaders usually are arranged so the discharge height can be regulated between a certain minimum and maximum, to suit height of truck, bin or pile the machine delivers to.

NEW MEMBERS

The following are new members of the Society:—

Toronto Chapter

Abrams, G., C.A., Sharp, Milne & Co., Toronto.
Anderson, A. A., Canadian Jefferson Electric Co., Ltd., Toronto.
Bairstow, E. J., M.C.I., Anaconda American Brass, Ltd., New Toronto.
Beatty, W. J., Beardmore Leathers, Ltd., Toronto.
Berney, J. P., Canadian Wirebound Boxes, Ltd., Toronto.
Bronsdon, H. H., British American Oil Co., Ltd., Toronto.
Copeman, N. C., Imperial Oil, Ltd., Toronto.
Creelman, T. W., International Petroleum Co., Ltd., Toronto.
Dean, C. D., Imperial Oil, Ltd., Toronto.
Durant, N. M., R. K. O. Distributing Corporation of Canada, Ltd., Toronto.
Field, A., International Petroleum Co., Ltd., Toronto.
Flynn, J., Oscar, Hudson & Co., Toronto.
Fraser, D. C., Anaconda American Brass, Ltd., New Toronto.
Gadsby, S. J., Kolster Radio Ltd., Toronto.
Gillelan, K. R., Agnew-Surpass Shoe Stores, Ltd., Brantford.
Hand, G. H., Maple Leaf Milling Co., Ltd., Toronto.
Haugh, J. W., J. A. Haugh Mfg. Co., Ltd., Toronto.
Hills, L. A., Canada Wire & Cable Co., Ltd., Leaside, Ont.
Houghton, R. F., Maple Leaf Milling Co., Ltd., Toronto.
Jephcott, G., C.A., P. S. Ross & Sons, Toronto.
Lefrancois, O. A., W. D. Beath & Son, Ltd., Toronto.
Manchee, P. G., United Drug Co., Ltd., Toronto.
Mayhew, G. F., Hinde & Dauch Paper Co. of Canada, Ltd., Toronto.
McGrath, J., Imperial Oil, Ltd., Toronto.
McMillen, T., Dominion Cutout Co., Ltd., Toronto.
Mullinger, C. H., International Petroleum Co., Ltd., Toronto.
Neff, J. R., C.A., Neff, Robertson & Co., Toronto.
Pratt, H. S., Consolidated Bakeries of Canada, Ltd., Toronto.
Scott, P. L., United Drug Co., Ltd., Toronto.
Thom, F. G., Fielder Paper Box Co., Ltd., Toronto.
Tindale, A. S., C.A., Muirheads Cafeterias, Ltd., Toronto.

Hamilton Chapter

Allston, G. E., Pure Milk Co., Ltd., Hamilton.
Reid, S. R., C.A., 400 Bank of Commerce Bldg., Hamilton.
Woolley, A. C., General Motors Truck & Coach of Canada, Ltd., Hamilton.

Winnipeg Chapter

White, H. F., Dominion Bridge Co., Ltd., Winnipeg.

CHAPTER NOTES

TORONTO

Reported by G. Alexander Phare.

The best canons of newspaper reporting demand that the salient features of the subject be tersely summarized (split infinitives do not count) in the opening paragraph, any corroborative details and local color being acceptable only in the later stages. Following tradition, therefore, Toronto Chapter held a dinner meeting in the Royal York Hotel on November 23rd last, steak was served for dinner, and this writer's steak was tough. Lest objection be taken to the mention of steak as a salient feature, be it added that it was almost as tough as some of the better known salients of the recent and regrettable war in Europe. Corroborative details and local color will now follow.

This meeting constituted the third in Toronto Chapter year, and since the preceding meetings had been addressed by outside speakers, considerable interest was added by the fact of its being conducted by three of our own members—Mr. B. W. Lang, of Goodyear Tire & Rubber Co., Ltd.; Mr. W. M. Lane, of Lever Bros. Ltd., and Vice-Chairman of Toronto Chapter, and Mr. R. Presgrave, of York Knitting Mills. The subject under review was "Labor Control"—a very vital one, in view of the fact that the last Dominion Census of Industry revealed that the total wage bill of Canadian companies for 1930 was $1,248,000,000.00, to which must be added private corporations and non-limited companies. Methods of controlling, and for securing adequate value, for this tremendous expenditure, were therefore of practical value.

Mr. W. M. Lane, speaking first, dealt with the methods and records in actual use in industrial organizations, based on the replies to a questionnaire sent out to 600 Canadian companies by our Society some time since. Those who attended the meeting were given a folder containing a specimen set of 24 labor control forms, covering every phase of the subject from the initial requisition for additional labor to the final departmental distribution of labor cost. At the close of his remarks Mr. Lane urged a practical but humanitarian consideration by the employer for his help, in the way of planning an employment policy which would assure to each worker a chance for peace of mind in his work, and economic independence through voluntary unemployment insurance, systematic stabilization of employment, and protection for the years when they would be unable to work.

Mr. B. W. Lang dealt more particularly with the preparation of these control statistics for the use of the management, and their various functions in operation. Mr. R. Presgrave, who made use of a blackboard to illustrate his remarks, analyzed the costs of indirect labor, and urged the allocation of as much as possible into direct channels. He suggested that, coming as he did at the end of the pro-

gramme, the audience would probably be more interested in a few thoughts on Twilight Sleep than on Labor Control, but managed, none the less, to keep his audience keenly interested and wide awake.

Discussion was more general and spontaneous than on some occasions, and quite a number of points of value were brought up. A very present problem was mentioned when the question was raised as to the allocation in costs of additional cost due to decreased volume of sales. Some sympathy, perhaps, was felt with the unknown accountant who is reported as having charged this excess in his books to the League of Nations!

The meeting, which was under the chairmanship of Mr. Kris Mapp, C.A., was attended by 106 members and their guests—probably the best attendance at a regular meeting for some considerable time. Toronto Chapter has this year been divided into teams, each under a captain, whose duty it is to try and have his entire team present at every meeting. The seating arrangements for this meeting were changed so that each team sat at a separate table, by which method absentees were—to be Irish—conspicuously visible. Apparently the reward for having practically the entire team on parade consists of tough steak!

A particularly happy portion of the evening was given over to welcoming 22 new members into Toronto Chapter—a ceremony carried out most acceptably by Mr. Guilfoyle. There is room for following up this good work by becoming better acquainted with these new men, and making them feel in a congenial element.

MONTREAL

Reported by R. Schurman, C.A., Secretary.

About 50 members of Montreal Chapter attended the meeting on November 6th, when Mr. S. P. Mapes, general manager of the Recording and Statistical Corporation, Ltd., spoke on "The Punched Hole Method." Mr. Mapes outlined briefly the mechanical process, and then showed its practical applications. (Mr. Mapes' address will be printed in full shortly.) His talk was followed by one by Mr. Miller, of the same company, on the use of the system in the Shawinigan Water & Power Company, Ltd. A general discussion followed.

About 100 members and friends listened with great interest to the address delivered by Mr. O. E. Sharpe, Commissioner, Workmen's Compensation Commission, entitled "Workmen's Compensation Accident Fund Administration and Accounting," at our meeting on Friday, November 20th.

Mr. Sharpe touched first of all upon his personal relations in the work executed by the Workmen's Compensation Commission, stating that the Administrative Body had acquired the services of a competent accountant, as well as such actuarial services as were required.

A description of the former act followed, showing where it failed to meet the requirements which conformed with industrial advances throughout the Province. The act is moulded and largely its activities and rates of insurance determined by those which already exist in the Province of Ontario.

Consideration was given in drawing the Act, to many questions concerning the retardation and acceleration of the industrial growth of the Province as a whole, and the final draft under which industries are expected to subscribe to are a result of such deliberations.

The meeting was subsequently thrown open to discussion, and for the period of at least an hour Mr. Sharpe was beseiged with questions of all kinds. Actual applications to manufacturing problems were outlined; actual costs and rates applicable to the various industries discussed; the inter-related activities of complex organizations, such as contracting firms—who have uncertain future prospects of business and no reliable knowledge of what kinds of labour and hazards are involved. Mr. Sharpe showed extreme agility in handling the many questions, many of which required a most judicial aptitude to answer without endangering or committing the Commission through its representative.

The meeting closed with a hearty vote of thanks proposed by Mr. P. W. Wright.

HAMILTON

Reported by R. Dawson, Secretary-Treasurer.

The third meeting of the Hamilton Chapter, held on November 12th, in the Chamber of Commerce rooms, was another success. On this occasion Mr. J. W. Spence, of The Canadian Kodak Co., Ltd., of Toronto, was the speaker, and his address, "The Thirteen Month Calendar," proved a most interesting one. Owing to the many counter attractions, the attendance was not what had been hoped for, but those who did attend expressed themselves as being delighted with Mr. Spence's talk.

The address provoked much discussion, and at the close the following resolution was unanimously carried and forwarded to Mr. G. Eastman, of Rochester, N.Y., one of the pioneers in Calendar Reform: "Resolved, that this meeting of The Hamilton Chapter, Canadian Society of Cost Accountants & Industrial Engineers, is of the opinion that some form of Calendar Reform is urgently necessary."

The next meeting of the chapter will be held on December 3rd, when Mr. G. W. Rice, Vice-President of The Bedaux Co., of New York City, will address the members on "Wage Incentives." Mr. Rice comes with a most excellent reputation as a speaker with a thorough knowledge of his subject, and it is anticipated that this meeting will gather together the largest attendance of the season. The executive of the chapter, along with any members who care to attend, will meet Mr. Rice at dinner at the Wentworth Arms Hotel at 6.30, adjourning to the Chamber of Commerce rooms for the meeting at 8 p.m.

The chapter has obtained five new members since the season opened, and with many prospects it is hoped to vastly increase this number in the very near future.

CENTRAL ONTARIO

Reported by Carl R. Dorschell, Secretary-Treasurer.

The November meeting of Central Ontario Chapter was held at the City Club, Galt, on Thursday evening, November 12, at 6.30. This was a dinner meeting and the arrangements were made to hold it at the Iroquois Hotel, but at the last minute we were forced to seek other accommodation as our dinner conflicted with that of committee in charge of the Community Relief Campaign. This looked like a tough break for the cost accountants, but ever resourceful as all good cost men should be, misfortune was turned into a stroke of luck. Thanks to Messrs. Arnold and Kidd, arrangements were made to hold the dinner and meeting at the City Club, which was more suitable for our purposes than the hotel. Invitations were mailed to a number of the local manufacturers, asking them to send a representative from their firm to attend this meeting, but only a few firms took advantage of our invitation, as most of the manufacturers in the city were on the committee for the Community Relief Fund. However, twenty were present to partake of a splendid dinner, which was prepared and served to the King's taste by the club steward and his staff.

"New Products—Their Development and Cost Control" was the subject chosen by the speaker, Mr. H. M. Hetherington of the Viceroy Manufacturing Company, Toronto. This paper was exceptionally well prepared and there is no doubt that Mr. Hetherington spent a lot of time on it. The subject was completely covered in a very thorough manner, and as I have been given to understand by Mr. McKague, that this paper will be published in Cost and Management, it will be unnecessary for me to elaborate on it, other than the fact that each step in the consideration of a new product was outlined from department to department from the time the enquiry for a new product was received by the sales department until it was accepted as a profitable line or rejected. Following this paper the meeting was opened for questions, and the speaker was kept busy answering queries with representatives from the Canadian General Rubber Company supplying the majority of the questions. These had reference to time studies, Bedaux system, scrap percentages, etc. A hearty vote of thanks was extended to Mr. Hetherington for coming up from Toronto to address our chapter.

Our next meeting will be held in Kitchener on Thursday, December 10, at the office of the Kaufman Rubber Company. Mr. R. Presgrave, of the York Knitting Mills Company, Toronto, will be the speaker, and his subject is "Group Wage Incentives—Their Advantages and Disadvantages." This meeting will start at 8 o'clock and we would like to see a good turnout to greet Mr. Presgrave. Please be present and bring a friend with you.

WINNIPEG

Reported by T. E. Saul, Secretary-Treasurer.

Winnipeg Chapter's meeting on November 17th was addressed by Alderman Simpkin, on "Unemployment—Causes and Suggested Remedies." Mr. Simpkin spoke first about the magnitude of the

problem of unemployment, but stated that, except in England, figures for which he quoted, there were no available complete records. In Canada, while such information had been sought through a questionnaire in the census returns, the result was not yet known. Trade union figures, mainly in the building trades, showed 15% of members unemployed last August, the percentage having steadily risen for some years.

The speaker believed the principal cause of the great amount of unemployment was that the worker was not financially able to buy back the amount of goods he produced, thus creating a surplus on the shelves which could not be disposed of with consequent increase of idle workers. He quoted figures to show the large margin between costs, as represented by raw materials, wages and overhead expenses, and the total value of goods produced. Another cause elaborated on was the increased output made possible by constantly improving machinery with, at the same time, a large reduction in the number of workers. So that the increased output was less in demand owing to the smaller purchasing power of the workers.

Mr. Simpkin believes that the cures will have to come slowly as this is a world condition and will have to be dealt with internationally. He thought one of the first moves should be to reduce the hours of labor without decreasing the wages of the employees, thus spreading the same purchasing power over a greater number of persons. He suggested a five day week of eight hours each as a start. Then a scheme of unemployment insurance should be inaugurated, and if necessary the age limit for Old Age Pensions reduced to 65 or 60 years and the age limit for youths employed in industry raised to 16 or even 18 years. He thought taxation, which is now bearing heavily on those least able to bear it, should be supplemented by some way of securing from the 1/10 of the population who control 9/10 of its wealth, a greater proportion to be available eventually as an increase in purchasing power to the 9/10 of the population who only control 1/10 of the wealth.

After Alderman Simpkin's address a number of questions were put forward and he was kept busy replying to them for a very interesting half hour or more.

THE TREND OF PRODUCTION COSTS

THE Dominion Bureau of Statistics index number of commodity prices, with 1926 as the base period, rose fractionally from 70.0 in September to 70.4 in October. The main group compare as follows:

	Oct. 1930	Sept. 1931	Oct. 1931
Foods, beverages and tobacco	87.0	67.9	67.3
Other consumers' goods	85.4	80.1	79.9
All consumers' goods	86.0	75.2	74.9
Producers' equipment	91.2	89.6	89.3
Building and construction materials	85.6	80.9	80.6
Manufacturers' materials	70.0	58.0	59.6
All producers' materials	72.8	62.1	63.4
All producers' goods	74.6	64.9	66.0
All commodities	81.0	70.0	70.4

THE TREND OF PRODUCTION COSTS

The most important reductions in October were in the following: Vegetables, live stock, meats, poultry, knit goods, raw wool and lime. The most important advances were in the following: Fresh foreign fruits, dried fruits, grains, eggs, raw cotton, raw silk, aluminium, silver, dyeing and tanning materials.

COST LITERATURE

RECEIVED IN NOVEMBER

DEPARTMENTAL Store Accounting Systems. K. C. Teare. Canadian Chartered Accountant, November, 1931.

Power Cost Accounts. J. Whitmore. Part II. Journal of Accountancy, November, 1931.

Why This System? W. B. Walker, F.C.W.A. Cost Accountant, October, 1931.

Cost Accounting for Coal Mines. J. A. Bullington. National Association of Cost Accountants, November 1, 1931.

Standard Costs in the Clay Products Industry. K. Barrette. National Association of Cost Accountants, November 1, 1931.

Maintenance Department—Its Purposes and Responsibilities. E. C. Brandt. Society of Industrial Engineers Bulletin, October, 1931.

Latest Developments in Industrial Lighting. R. B. Brown, Jr. Society of Industrial Engineers Bulletin, October, 1931.

Budgeting As a Means of Internal Control. G. R. Lohnes. Certified Public Accountant, November, 1931.

Essentials of the Funded and Current Industrial Debt. F. A. Thulin. Certified Public Accountant, November, 1931.

Major Problem Created by the Machine Age. A. Anderson, C.P.A. The Accountant, October 24, 1931.

Motion Study and the Movie Camera. L. H. Freeman. National Association of Cost Accountants, November 15, 1931.

Accounting for Unused Facilities. W. P. Fiske. National Association of Cost Accountants, November 15, 1931.

Standard Costs For the Naca Manufacturing Company. National Association of Cost Accountants Year Book, 1931.

Standard Costs in The Machine Tool and Steel Industries. National Association of Cost Accountants Year Book, 1931.

Development and Use of Production Standards. National Association of Cost Accountants Year Book, 1931.

Development and Use of Distribution Standards. National Association of Cost Accountants Year Book, 1931.

Establishment of Control Through the Budget. National Association of Cost Accountants Year Book, 1931.

Application of Uniform Costing to Industry. A. Williamson, F.C.W.A. Cost Accountant, November, 1931.

Problem of Practical Cost Control. H. Wilmot, F.C.W.A. Cost Accountant, November, 1931.

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